

REMARKS

The nonfinal Office Action dated March 4, 2004 and the cited references have been carefully considered.

I. Status of the Claims

Claims 1-41 are pending. Claims 22-29 are withdrawn pursuant to an election made on June 3, 2003 by the Applicant's attorney. The Applicant reserves the right to file one or more divisional patent applications at an appropriate future date.

Claims 16-21 and 37-39 are allowed. The Applicant wishes to thank the Examiner for indicating that these claims are allowed.

Claims 1-15, 30-36, and 40-41 are rejected under 35 U.S.C. § 102(b) as being anticipated by Farrah (U.S. Patent 5,432,077). The Applicant respectfully traverses this rejection for the reasons set forth below.

II. Claim Rejection Pursuant to 35 U.S.C. § 102(b)

Claims 1-15, 30-36, and 40-41 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,432,077 to Farrah ("Farrah"). Applicant respectfully traverses this rejection because Farrah does not disclose a carbon adsorbent having a BET surface area greater than about 100 m²/g as required by claims 1-15, 30-36, and 40-41. Moreover, Farrah does not disclose a carbon adsorbent incorporated with an oxygen-containing compound of iron (II), aluminum or both as in claims 1-7, or a method of making same as in claims 8-15. Farrah also does not disclose a carbon adsorbent incorporated with an iron (III) hydroxide as in claims 30-36,

or a method for making same as in claims 35-36. Accordingly, Farrah fails to disclose each and every element of each of rejected claims 1-15, 30-36, and 40-41 to form a proper anticipatory reference.

Pursuant to Section 102, a claim is anticipated "only if each and every element as set forth in the claim is found, either expressly or inherently described, in a *single* prior art reference."

Verdegaal Bros. v. Union Oil Co. of California, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987)

(emphasis added). "The identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Thus, invalidity by anticipation "requires that the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation." See Advanced Display Systems Inc. v. Kent State University, 54 U.S.P.Q.2d 1673 (Fed. Cir. 2000).¹ Here, viewing the four corners of Farrah, Farrah's adsorbent material and method fail to disclose each and every element of the adsorbent for removing heavy metals and method of making same as claimed in claims 1-15, 30-36, and 40-41, and, as such, cannot enable one skilled in the art to make the patented apparatus.

Farrah discloses a product for and method of enhancing the antimicrobial properties of a surface using a water-insoluble polyvalent metal salt adsorbent. The adsorbent includes activated carbon having ammonium ions and either iron (III) and calcium, or iron (III) and magnesium (*see* Table 5), or activated carbon impregnated with one of three metal salts (ferric chloride, calcium

¹ The "reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter." See PPG Industries v. Guardian Industries Corp., 75 F.3d 1558, 1566, 37 USPQ2d 1618 (Fed.Cir. 1996) (emphasis added). See also Motorola v. Interdigital Technology Corp., 121 F.3d 1461, 1471, 43 USPQ2d 1481, 1489 (Fed.Cir. 1997).

chloride, and magnesium chloride), and ammonium hydroxide to remove bacteriophage MS2 (a virus) (*see* Column 8, lines 8-17; and Table 5 and footnotes thereto). Furthermore, removing or destroying a virus requires different principles of science than removing anions of heavy metals because a virus is an organic material and has a size of many orders of magnitudes greater than the size of inorganic anions.

By contrast the claimed invention shows an adsorbent and method for making an adsorbent for use in removing heavy metal anions from a liquid or gas medium. The adsorbent comprises a porous carbon having a BET surface area greater than about 100 m²/g. The claimed carbon has incorporated therein at least one oxygen-containing compound of at least one metal selected from the group consisting of iron (II) and aluminum, or combinations thereof, or iron (III) hydroxide; and methods for making said adsorbents.

Farrah does not disclose a carbon adsorbent having a BET surface area greater than about 100 m²/g. In fact Farrah does not even disclose the surface area of the carbon for enhancing the antimicrobial properties. Instead, the Examiner has relied on U.S. Patent 5,965,483 to Baker ("Baker") in effort to supply this deficiency; thus citing two separate references. Reliance on separate references is improper and cannot form a proper basis for rejection of the claims pursuant to 35 U.S.C. § 102.

A second reference may be used under 35 U.S.C. § 102 in only one of three limited circumstances: (1) to prove that the primary reference contains an enabled disclosure; (2) to explain the meaning of a term used in the primary reference; or (3) to show that a characteristic not disclosed in the primary reference is inherent. M.P.E.P. § 2131.01 (8th ed., Rev. 1, Feb. 2003). The Examiner has cited Baker for the premise that "Typical commercial activated carbon

products exhibit a surface area ... of at least $300 \text{ m}^2/\text{g}$." Baker, Column 1, lines 54-57. However, the Baker patent discloses nothing more than a typical carbon product. That an activated carbon has a typical property does not necessarily and naturally lead to the conclusion that the property is inherent in all activated carbons. A certain minimum magnitude of surface area is not an inherent property of a carbon product. To be inherent, the unmentioned feature at issue must *necessarily be present* in the reference.¹ Finnigan Corp. v. International Trade Commission, 180 F.3d 1354, 1365 (Fed. Cir. 1999). Such reference does not support the conclusion that Farrah's carbon has a surface area greater than about $100 \text{ m}^2/\text{g}$ when he is silent about such magnitude of the surface area. Accordingly, it is improper to impart this property to Farrah's carbon.

Moreover, Farrah's carbon product does not inherently have a surface area greater than about $100 \text{ m}^2/\text{g}$, as required by claims 1-7, 14, 30-34, and 40-41. Farrah does not disclose and his carbon product cannot be construed to have an inherent micropore volume of greater than about $20 \text{ cm}^3/100\text{g}$ as required by claim 15.

Farrah also does not disclose carbon incorporated with an oxygen-containing compound of iron (II) or aluminum or both as in claims 1-7. Rather Farrah requires an activated carbon having ammonium ions and either iron (III) and calcium, or iron (III) and magnesium. *See* Table 5. Farrah explicitly discloses that ammonium ions are not removed from his final product. *See* column 8, lines 8-16. Accordingly, Farrah does not disclose an adsorbent having as few as one or two metals. Moreover, Farrah does not disclose that as few as one or two metals can be present up about 50% by weight of the porous carbon, as is recited in claims 12 and 34.

¹ A result is inherent only if it *naturally flows* from the teaching of the prior art.); Continental Can Co. USA v. Monsanto Co., 20 U.S.P.Q2d 1746, 1749 (Fed. Cir. 1991) ("Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." (emphasis in original).)

Regarding claims 8-15 and 30-36, the Examiner relies on Titanium Metals Corporation of America v. Banner, 227 U.S.P.Q. 773 (Fed. Cir. 1985), to reject these claims on the rationale that Farrah's single example directed to a carbon impregnated with ferric chloride, calcium chloride, magnesium chloride, and ammonium hydroxide must also have had the property of removing heavy metal anions of the carbon adsorbents of the instant claims. The Applicant respectfully points out that the Examiner's reliance on Titanium is misplaced. In Titanium, the claims recite ranges of nickel and molybdenum that include a specific composition disclosed in the prior art reference. *Id.* at 774-775. Because a species anticipates a genus, the court held that Titanium's claims were anticipated, and Titanium's recitation of "good corrosion resistance" in the claims was entitled to no weight.

In contradistinction, Farrah merely discloses a general method (at column 4, lines 9-57) and a general collection of different salts (column 3, lines 52-62) separately from the general method. Farrah does not teach a specific method of making carbon adsorbent comprising iron (II) that is capable of removing anions of heavy metals, as recited in claims 8-15.

Furthermore, Farrah does not disclose a method for making carbon incorporated with an oxygen-containing compound of iron (II), aluminum or both as in claims 8-15. Because disclosure of a genus cannot anticipate a claimed species, Farrah does not anticipate claims 8-15. An activated carbon having ammonium ions and either iron (III) and calcium, or iron (III) and magnesium. *See* Table 5. Farrah explicitly discloses that ammonium ions are not removed from his final product. *See* column 8, lines 8-16. Farrah also does not disclose a porous carbon having a micropore volume greater than about 20 cm³/100g, as is recited in claim 15.

Regarding claims 30-36, Farrah does not disclose a porous carbon having a surface area greater than about $100 \text{ m}^2/\text{g}$ or a resulting property of removing anions of heavy metals, as recited in claims 30-36. As pointed out above, Farrah's carbon cannot be construed to have an inherent surface area of greater than about $100 \text{ m}^2/\text{g}$. Farrah also does not disclose a carbon adsorbent incorporated with an iron (III) hydroxide as in claims 30-34, nor does Farrah disclose a method for making same as in claims 35-36. Farrah discloses an activated carbon impregnated with three metal salts (ferric chloride, calcium chloride, and magnesium chloride), and ammonium hydroxide to remove bacteriophage MS2 (a virus). Column 8, lines 8-17; and Table 5 and footnotes thereto.

Farrah is not directed to adsorbents for removing heavy metals, but is for removing or destroying a virus. Removing or destroying a virus requires different principles of science than removing anions of heavy metals because a virus is an organic material and has a size of many orders of magnitudes greater than the size of inorganic anions that are recited in claims 30-36. Thus, Farrah's observation that activated carbon impregnated with ferric chloride, calcium chloride, magnesium chloride, and ammonium hydroxide can remove viruses cannot lead to a conclusion that the same impregnated carbon has the inherent property of removing inorganic anions because the ability of remove organic materials (primarily proteins in viruses and bacteria) does not naturally and necessarily lead to an ability of removing inorganic anions. Ex parte Levy, 17 U.S.P.Q.2d 1461, 1464 (B.P.A.I. 1990) ("[T]he Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily flows* from the teachings of the applied prior art.") (emphasis added). The ability of Farrah's impregnated product with ammonium ions (please note that Farrah does

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not wash his impregnated product as the Examiner contended) to remove or destroy virus and bacteria may have been the result of the synergistic effect of ammonium ions and other metal ions. Such synergistic effect cannot be said to be inherently applicable to the property of removing anions of heavy metals recited in the instant claims. Biological and chemical arts are inherently unpredictable. As such, unless a reference specifically discloses the claimed product property, it cannot be said that the reference inherently has the claimed property, especially when the reference does not disclose the exact composition of the claim. Because Farrah does not specifically disclose the claimed property of removing anions of heavy metals, Farrah does not anticipate claims 30-36.

Furthermore, for at least the reasons set forth above Farrah does not teach or even suggest the carbon adsorbent and method for making carbon adsorbent claimed in claims 1-15, 30-36, and 40-41. Accordingly reconsideration is respectfully requested.

III. Information Disclosure Statement ("IDS")

On January 29, 2004, Applicant submitted an IDS, a copy of which is appended hereto in Appendix A. The IDS was not initialed as having been considered by the Examiner. The Examiner is respectfully requested to do in response hereto.

IV. Conclusion

In view of the above, it is submitted that the claims are patentable and in condition for allowance. Reconsideration of the rejection and allowance of claims at an early date are respectfully requested.

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Applicant would appreciate a telephone call to the undersigned attorney of record should the Examiner have any questions or comments with respect to this response or the claim language for purposes of efficiently resolving same.

Respectfully submitted,

By



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Appendix A